

termination of the Sun's apparent diameter is not less than $0.1''$, and it appears that the observed difference of diameters is also $0.1''$.

May we not conclude that the difference of the apparent diameters is probably less than $0.4''$, but perhaps greater than $0.3''$?

Note on the Relative Space-penetrating Power of the Pulkowa 15-inch Refractor and Mr. Lassell's 4-foot Reflector. By M. Otto Struve.

In his paper "On the Relative Power of Achromatic and Reflecting Telescopes" (*Monthly Notices*, vol. xxxvi. pp. 305-309) Dr. Robinson makes the following statement:—

"2. Otto Struve thought that the Pulkowa Achromatic of 15-inches was equal to Lassell's 24-inch Newtonian (not his 4-feet, as supposed by M. Radau): nothing definite can be built on this."

I feel sure, if Dr. Robinson had read my paper, "Ueber das von Herrn W. Lassell in Malta aufgestellte Spiegelteleskop," published in the beginning of 1864 in the *Bulletin de l'Académie de St.-Petersbourg*, he would have considerably modified his words, and perhaps also his views. In fact, M. Radau has been quite correct in his statement. I wrote the above-mentioned paper immediately after having visited my honoured friend Mr. Lassell at Malta. Together with some other results derived from practical experience, I have given there, *in extenso*, the comparison of the ultima visibilia in the nebula of *Orion*, observed at Pulkowa by Dr. Winnecke, simultaneously with me, at Malta. The result of this comparison is expressed in the following terms:—"The preceding comparison of almost simultaneous observations made at Malta and Pulkowa proves evidently that the space-penetrating power of Lassell's new (4-feet) instrument can hardly be estimated superior to that of ours (the Pulkowa 15-inch) refractor; especially if we consider that at Pulkowa the nebula of *Orion* has been observed at a height of only 25° , while at Malta the observations were made at the height of 49° ."

I beg leave to add that in 1863, as a great many comparisons made about that time have proved, my eye was still quite of the same strength with that of Dr. Winnecke.

Pulkowa, 1876, November.

On the Position of the Point of Maximum Brightness on Venus.

• By E. Neison, Esq.

Supposing *Venus* to reflect the solar rays from a dead or unpolished surface, the intensity of illumination of the surface at any point P will be proportional to the cosine of the zenith

G

distance of the Sun ($=z$) at that point. Then from a known optical principle, the apparent brightness of the surface at P as seen from the Earth will be proportional to the real illumination. Consequently, the apparent brightness B of any point on *Venus* as seen from the Earth will be

$$B = A \cos z.$$

The point where the apparent brightness is greatest will be therefore that where the Sun is in the zenith.

Consequently, when *Venus* is crescent, or less than one half of the illuminated hemisphere of *Venus* is visible, the limb of the planet will be the brightest portion. This is what the observations of Capt. Noble (*Monthly Notices*, vol. xxxv. p. 350) have already indicated. When, however, the planet is gibbous, so that more than half the illuminated hemisphere can be seen, then the point of maximum illumination will be within the limb. Under these conditions, in fact, the region of maximum brightness will be an ellipse of great eccentricity.

This is in accord with the observations of Mr. Christie, communicated to the Society in November 1876.

These two series of observations are not therefore, discordant, as might be supposed, and neither confirm the hypothesis that the solar rays are specularly reflected from the surface of *Venus*.

Note on the Gradation of Light on the Disk of Venus.

By W. H. M. Christie, Esq.

Some months ago Mr. Brett pointed out that there was a gradation of brightness towards the limb of *Venus* as well as, in a more marked degree, towards the terminator, and he considered that this was due to specular reflexion modified by large atmospheric diffusion. As *Venus* was then becoming crescent-shaped, and therefore unfavourably situated for showing any effect of specular reflexion, I had no opportunity of testing the point till after inferior conjunction. When the planet became gibbous again, I examined the disk on several occasions in the forenoon with the direct-vision polarising eyepiece, described in the *Monthly Notices* for last January, applied to the Great Equatorial of the Greenwich Observatory, and was thus enabled to reduce the brightness very gradually to the point of total disappearance. On October 12 the disk was reduced, on turning the Nicol prism, to an oblong patch, the edge of which was distant about one-sixth of the diameter of *Venus* from the limb, special attention being directed to this point. Afterwards, on November 28 and December 6, under more favourable circumstances, four distinct phases were remarked, corresponding to different readings of the position-circle attached to the Nicol, and indicating four different degrees of brightness: